OAK RIDGE INSTITUTE
FOR SCIENCE AND EDUCATION
Shaping the Future of Science

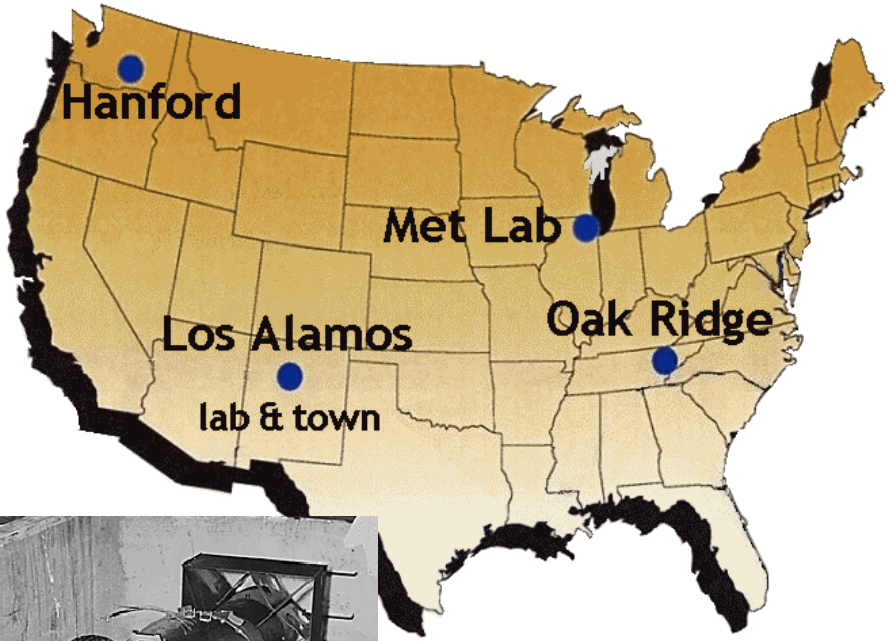
A long and winding road
DOE worker studies

Presented at the USTUR SAC

April 11, 2019

Betsy Ellis, PhD

December 6,1941- August 6, 1945



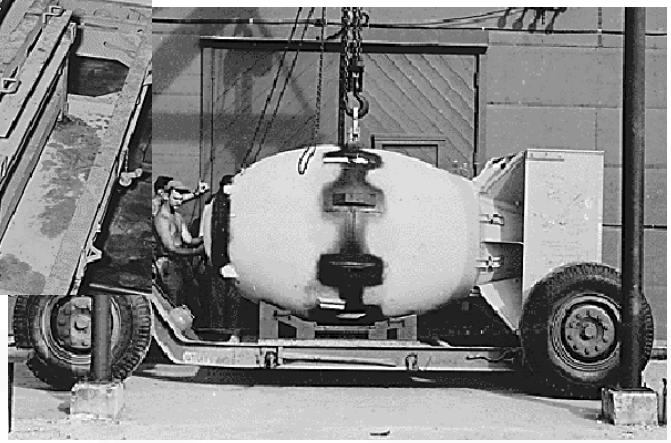
Honolulu Star-Bulletin 1st EXTRA

WAR!

(Associated Press by Transpacific Telephone)

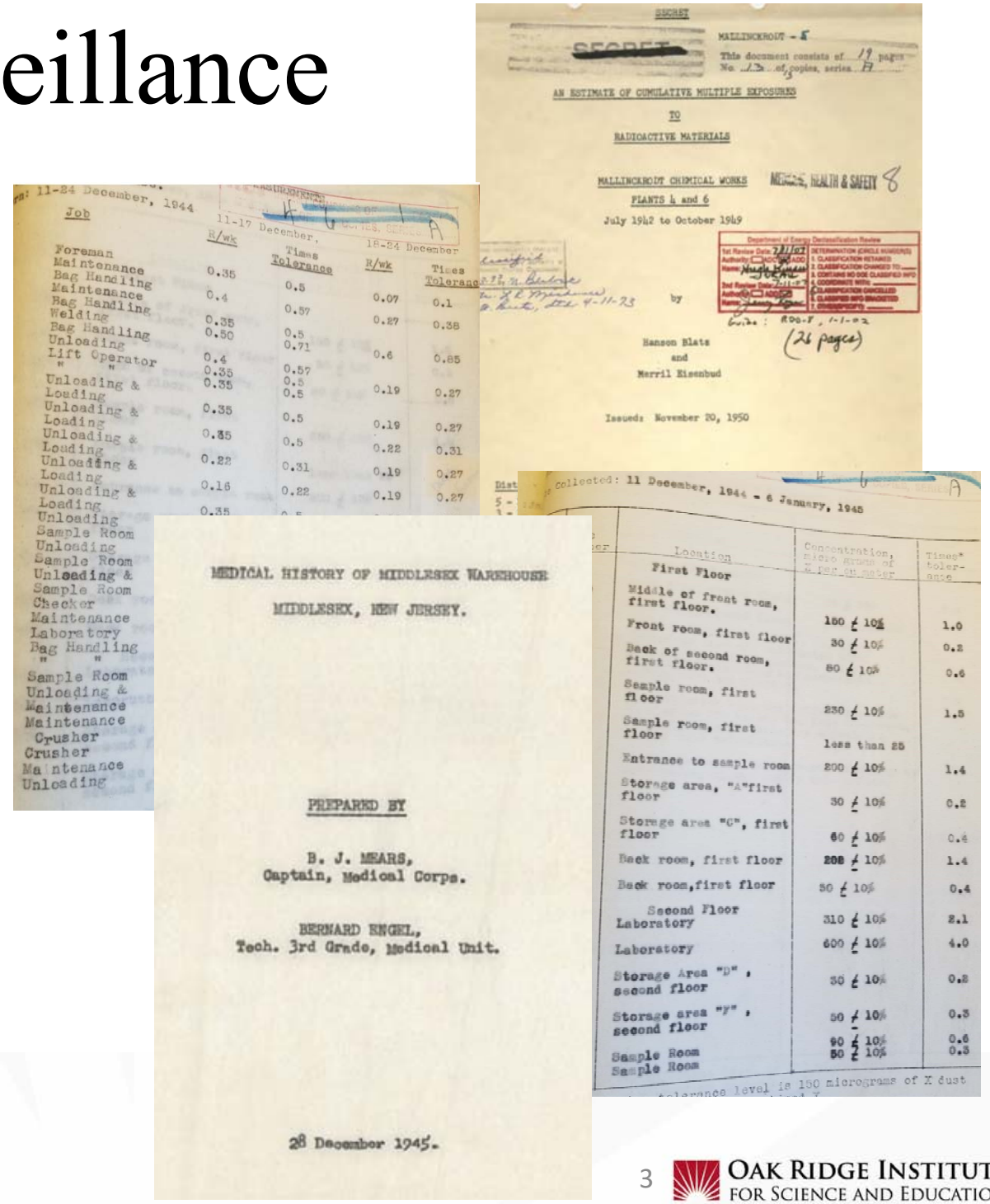
SAN FRANCISCO, Dec. 7.—President Roosevelt announced this morning that Japanese planes had attacked Manila and Pearl Harbor.

OAHU BOMBED BY JAPANESE PLANES



Medical surveillance 1942-

- Physicals
- Film Badge
- Breath Radon
- Urinalysis
- Dust exposure



SECRET

MALLINCKRODT - E

This document consists of 19 pages
No. 1 of 5 copies, series A

AN ESTIMATE OF CUMULATIVE MULTIPLE EXPOSURES
TO
RADIOACTIVE MATERIALS

MALLINCKRODT CHEMICAL WORKS
PLANTS 4 and 6
July 1942 to October 1949

by
Hanson Blatz
and
Merril Eisenbud

(26 pages)

Issued: November 20, 1950

MEDICAL HISTORY OF MIDDLESEX WAREHOUSE
MIDDLESEX, NEW JERSEY.

PREPARED BY

B. J. MEARS,
Captain, Medical Corps.

BERNARD ENGEL,
Tech. 3rd Grade, Medical Unit.

28 December 1945.

Job	11-17 December, R/wk	Times Tolerance	18-24 December R/wk	Times Tolerance
Foreman	0.35	0.5	0.07	0.1
Maintenance Bag Handling	0.4	0.57	0.27	0.38
Maintenance Bag Handling	0.35	0.5		
Welding Bag Handling	0.50	0.71	0.6	0.85
Unloading Lift Operator	0.4	0.57		
" "	0.35	0.5	0.19	0.27
Unloading & Loading	0.35	0.5	0.19	0.27
Unloading & Loading	0.35	0.5	0.22	0.31
Unloading & Loading	0.22	0.31	0.19	0.27
Unloading & Loading	0.16	0.22	0.19	0.27
Unloading Sample Room	0.35			
Unloading Sample Room				
Unloading & Sample Room Checker				
Maintenance Laboratory				
Bag Handling " "				
Sample Room Unloading & Maintenance				
Maintenance Crusher				
Crusher Maintenance				
Unloading				

Collected: 11 December, 1944 - 6 January, 1945

Location	Concentration, micro Grams of X per cu meter	Times* tolerance
First Floor		
Middle of front room, first floor.	150 ± 10%	1.0
Front room, first floor	30 ± 10%	0.2
Back of second room, first floor.	80 ± 10%	0.6
Sample room, first floor	230 ± 10%	1.5
Sample room, first floor	less than 25	
Entrance to sample room	200 ± 10%	1.4
Storage area, "A" first floor	30 ± 10%	0.2
Storage area "C", first floor	60 ± 10%	0.4
Back room, first floor	208 ± 10%	1.4
Back room, first floor	80 ± 10%	0.4
Second Floor Laboratory	310 ± 10%	2.1
Laboratory	600 ± 10%	4.0
Storage Area "D", second floor	30 ± 10%	0.2
Storage area "F", second floor	50 ± 10%	0.3
Sample Room	90 ± 10%	0.6
Sample Room	50 ± 10%	0.3

tolerance level is 150 micrograms of X dust

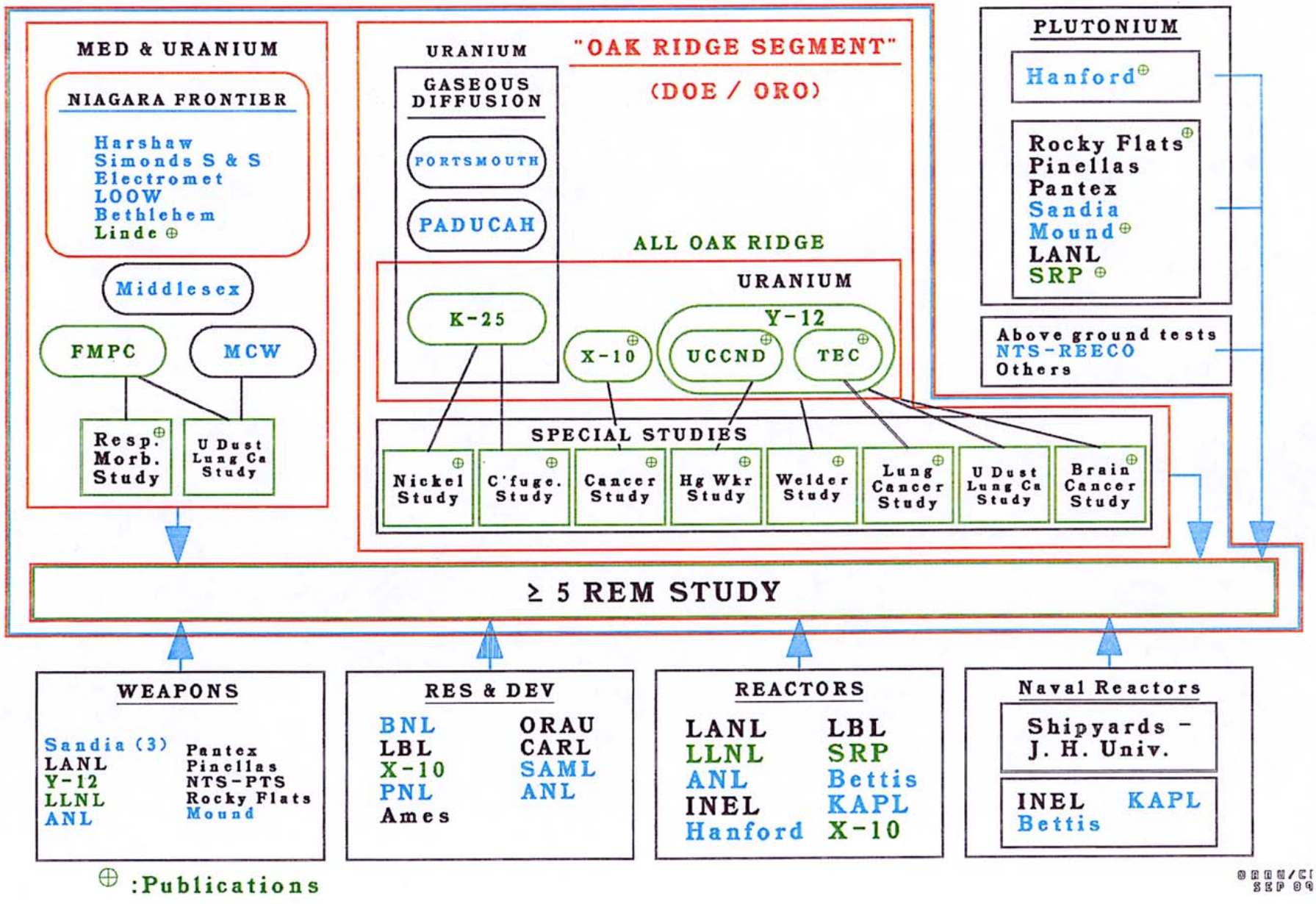
Atomic Energy Commission

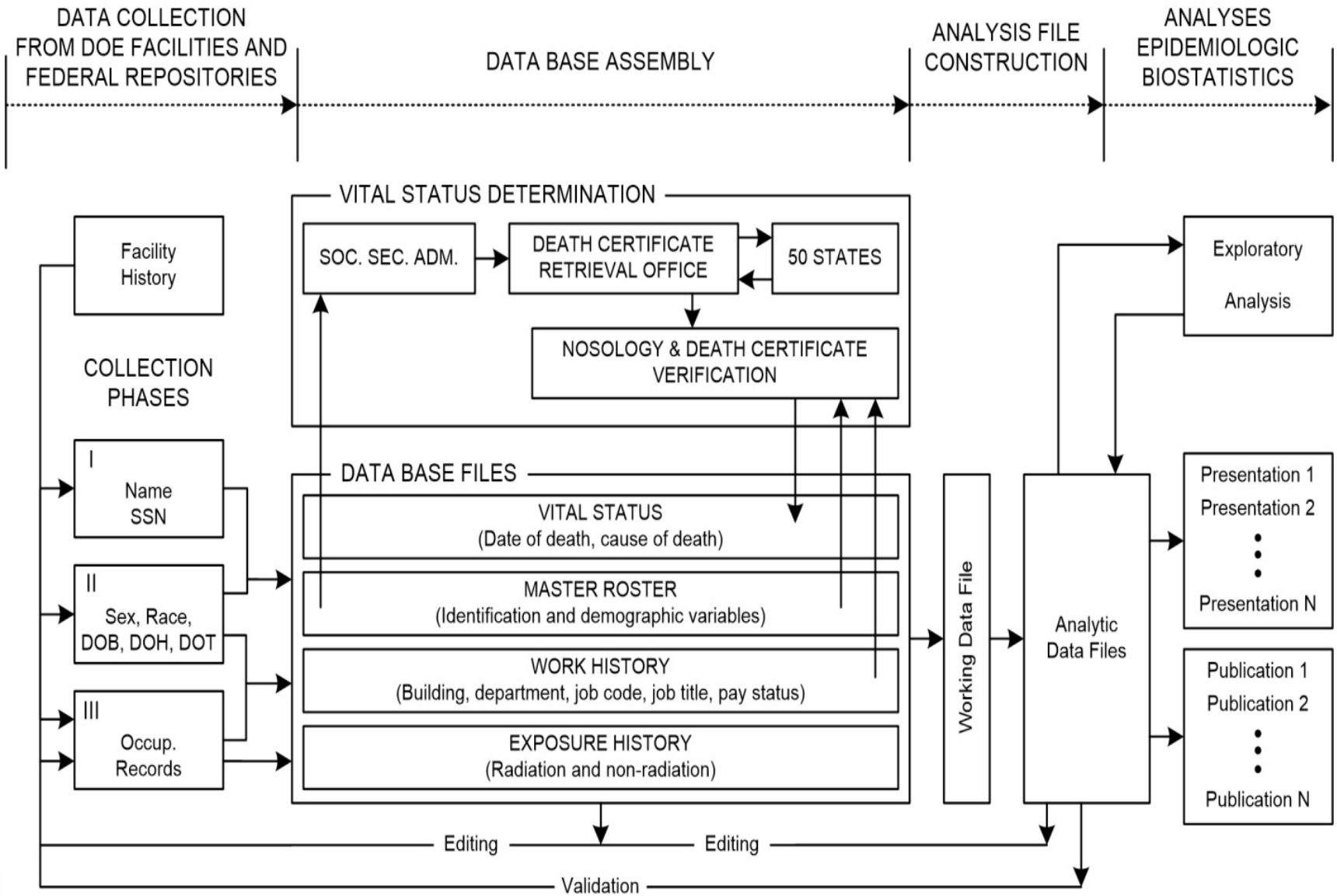
- Early 1960s – feasibility of epidemiologic studies
  - University of Colorado
  - 2 uranium processing sites
- 1964-1977 – University of Pittsburgh
  - 1964-1969 – 5 year pilot study
    - Provide upper bound of cancer risk associated with chronic low levels of ionizing radiation exposure
    - Additional sites added
    - Locate hard copy records – save from destruction
    - Standardize procedures – computerization, vital status, death certificates
  - 1970-1977 – Hanford

ERDA/DOE Epidemiology Program

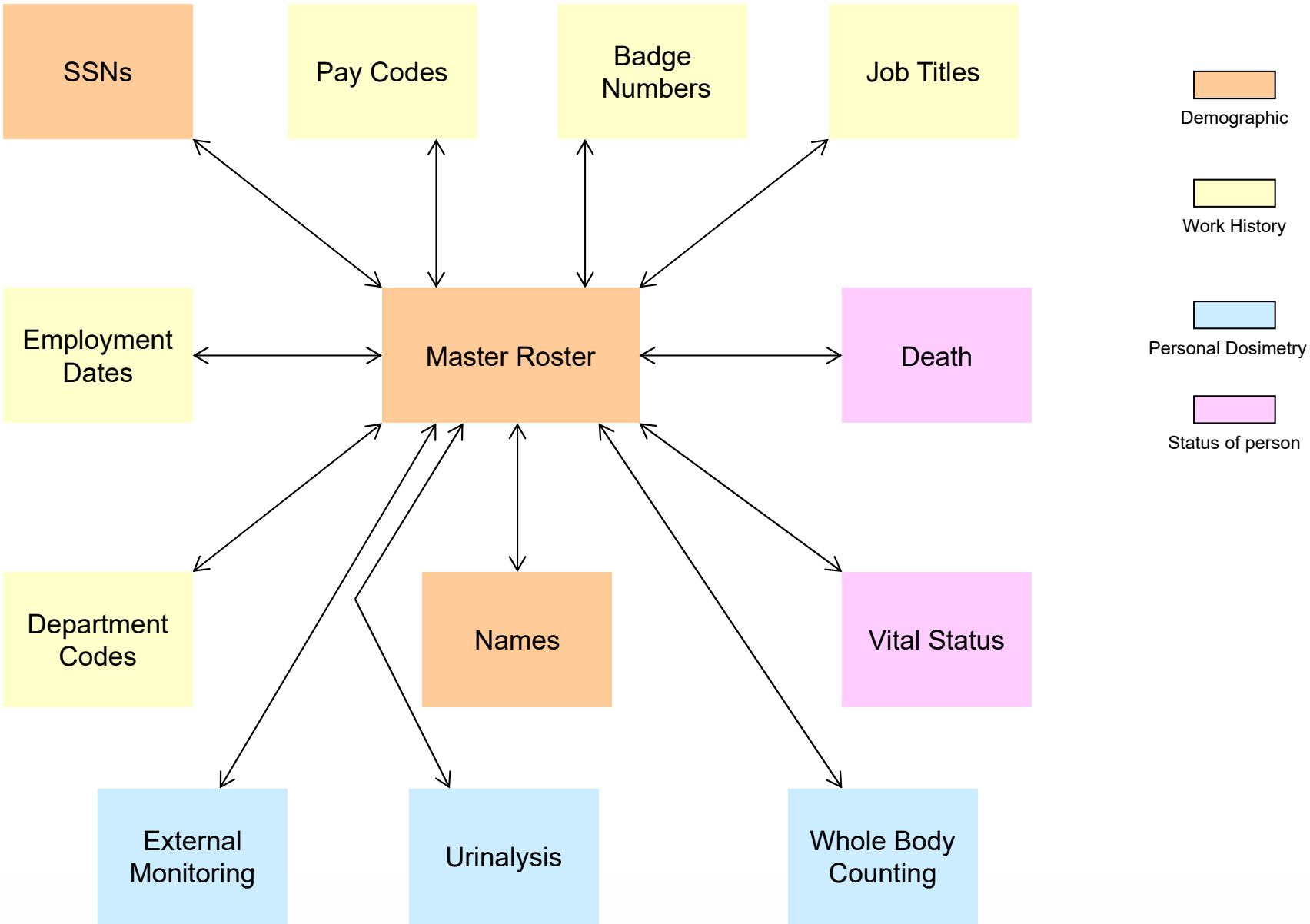
- 1977 – Transition to 3 research groups
  - Hanford/PNNL – Hanford site
  - Los Alamos National Laboratory – Pu sites
  - Oak Ridge Associated Universities – U sites
- 1979 – Comprehensive Epidemiologic Study of Atomic Workers
  - All active and inactive sites
  - Standardized procedures for vital status follow up and death certificate retrieval

DOE HEALTH & MORTALITY STUDIES





CER Data Model

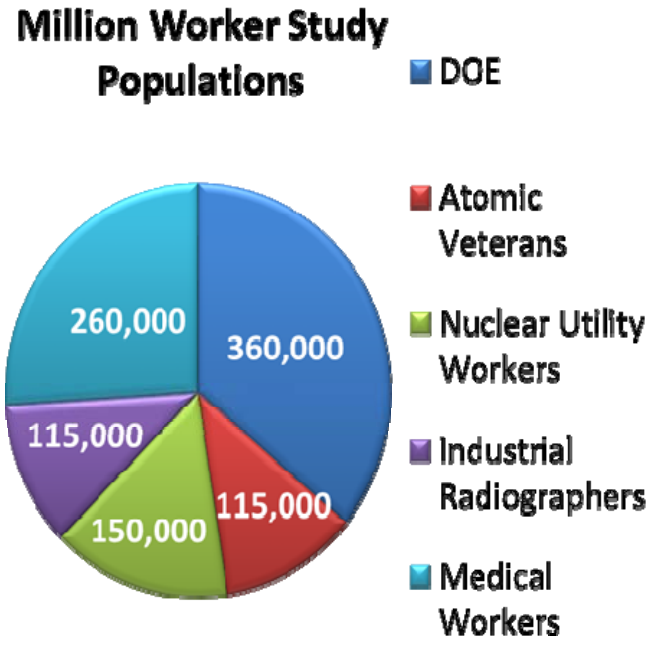


Comprehensive Epidemiologic Data Resource (CEDR) 1990-

- 1989 -- Independent review of DOE's epidemiology program
  - Make data available to larger research community
  - Spirit of government openness
  - Provide resource for training
- 3 DOE epidemiology programs folded into 1 at ORISE
- 2019 -- 76 studies, 1M+ workers at 31 DOE sites
  - No personal identifiers
  - Dates masked
  - 2 types of files
    - Working files
    - Analytic files
  - Apply to use

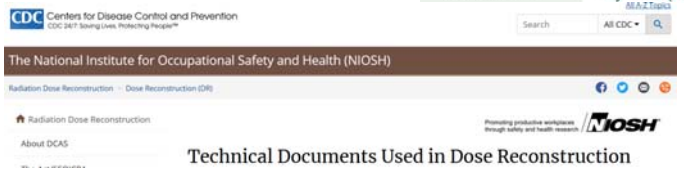
Million Person Study 2001-

- Near-term goal
  - Update all cohort studies in CEDR
    - Good stewards of DOE funds
    - Ripe for update
    - Disease risk / unit dose to target organ
      - Apply new biokinetic and dosimetry models
    - Standard procedures
- Long-term goal
  - Risks at low doses, esp. <100 mGy
  - Combine cohorts
  - Statistical power

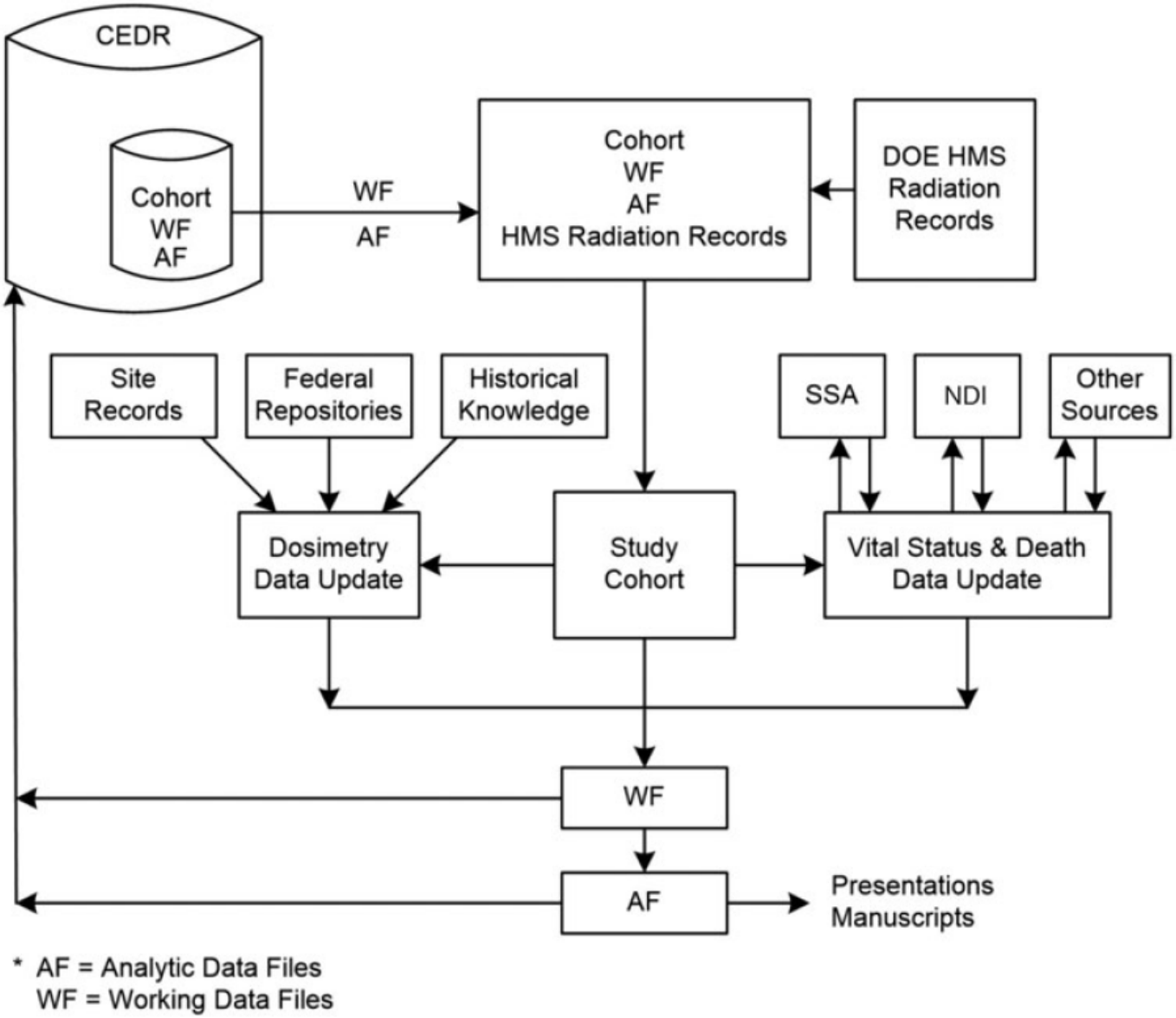


MPS – Use of other DOE-related assets

- ORISE
  - CEDR
  - CER Data Model
  - DOE Radiation Effects Monitoring System
  - NRC Radiation Exposure Information System
  - Historical knowledge
- DOE Site
  - SMEs
  - Record Centers
- USTUR
  - Validate biokinetic models
- NIOSH Radiation Dose Reconstruction Program
  - Site profiles – 6 Technical Basis Documents



CEDR → MPS → CEDR



Million Person Study – Status of DOE cohorts

- Updated cohorts
  - Rocketdyne
  - Mound
  - Mallinckrodt Chemical Works
- Current cohorts
  - Los Alamos National Laboratory
    - Follow-up Wiggs & Galke studies for plutonium exposure
    - High alpha exposure is closest human analog to high Z exposures in space
  - Fernald, Middlesex, Mallinckrodt & Port Hope – combined study of uranium processors (partnering with U of California San Francisco)
- Up next: Rocky Flats, SRS, Hanford, or possibly Y12

THANK YOU

Memorial Sloan Kettering Cancer Center

ToxStrategies

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WASHINGTON STATE UNIVERSITY

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